

SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

Product Identifier

SRM Number: 136f
SRM Name: Potassium Dichromate (Oxidimetric Standard)
Other Means of Identification: Not applicable.

Recommended Use of This Material and Restrictions of Use

This Standard Reference Material (SRM) is certified as a chemical of known assay and is intended for use as a primary oxidimetric standard. A unit of SRM 136f consists of 60 g of highly purified potassium dichromate ($K_2Cr_2O_7$) in a clear glass bottle.

Company Information

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2. HAZARDS IDENTIFICATION

Classification

Physical Hazard:	Oxidizing Solid	Category 2
Health Hazard:	Acute Toxicity, Oral	Category 3
	Acute Toxicity, Inhalation	Category 2
	Acute Toxicity, Dermal	Category 4
	Skin Corrosive/Irritation	Category 1B
	Serious Eye Damage/Eye Irritation	Category 1
	Respiratory Sensitizer	Category 1B
	Skin Sensitizer	Category 1B
	Germ Cell Mutagenic	Category 1B
	Carcinogenic	Category 1A
	Reproductive Toxicity	Category 1B
	STOT – Repeat Exposure	Category 1

Label Elements

Symbol



Signal Word

Danger

Hazard Statement(s)

H272	May intensify fire, oxidizer.
H301	Toxic if swallowed.
H312	Harmful in contact with skin.
H314	Causes severe skin burns and eye damage.
H334	May cause allergic or asthmatic symptoms or breathing difficulties if inhaled.
H317	May cause allergic skin reaction.
H330	Fatal if inhaled.
H340	May cause genetic defects.
H350	May cause cancer of the respiratory system by inhalation.

H360FD May damage fertility. May damage the unborn child.
H372 Causes damage to kidneys through prolonged or repeated exposure.

Precautionary Statement(s)

P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P210 Keep away from heat, sparks, open flames, and hot surfaces. – No Smoking.
P220 Store away from clothing and combustible materials.
P271 Use only outdoors or in a well-ventilated area.
P260 Do not breathe dust or mist.
P264 Wash hands thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P272 Contaminated work clothing should not be allowed out of the workplace.
P280 Wear protective gloves, protective clothing, eye protection/face protection.
P284 Wear respiratory protection.

P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P302+P352 IF ON SKIN: Gently wash with plenty of soap and water.
P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a POISON CENTER or doctor.

P403+P233 Store in a well-ventilated place. Keep container tightly closed.
P405 Store locked up.

P501 Dispose of contents and container in accordance with applicable local regulations.

Hazards Not Otherwise Classified: None.

Ingredients(s) with Unknown Acute Toxicity: None.

3. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Substance: Potassium dichromate

Other Designations: Dichromic acid, dipotassium salt; potassium bichromate; bichromate of potash; iopezite; $\text{Cr}_2\text{K}_2\text{O}_7$.

Components are listed in compliance with OSHA's 29 CFR 1910.1200.

Hazardous Component(s)	CAS Number	EC Number (EINECS)	Nominal Mass Concentration (%)
Potassium dichromate	7778-50-9	231-906-6	100

4. FIRST AID MEASURES

Description of First Aid Measures

Inhalation: If adverse effects occur, remove to well-ventilated (uncontaminated) area. Seek immediate medical attention. If not breathing, qualified personnel should give artificial respiration.

Skin Contact: Rinse affected skin with water for at least 15 minutes, then wash thoroughly with soap or mild detergent and water. Seek medical attention if needed and bring the container or label.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Seek immediate medical attention.

Ingestion: If swallowed, drink plenty of water; do NOT induce vomiting. Get immediate medical attention. Induce vomiting only at the instructions of a physician. Do not give anything by mouth to unconscious person.

Most Important Symptoms/Effects, Acute and Delayed

Inhalation: Lung congestion and damage, ear damage, kidney damage, liver damage, nerve damage, cancer.

Skin Contact: Potentially fatal on contact with skin.

Eye Contact: Eye damage.

Ingestion: Potentially fatal if swallowed.

Indication of any immediate medical attention and special treatment needed, if necessary: If any of the above symptoms are present, seek immediate medical attention.

5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Negligible fire hazard; oxidizer; might ignite or explode on contact with combustible materials. See Section 9, "Physical and Chemical Properties" for flammability properties.

Extinguishing Media

Suitable: Water.

Unsuitable: Dry chemicals, carbon dioxide foam, or halogenated extinguishing agents.

Specific Hazards Arising from the Chemical: Not applicable.

Special Protective Equipment and Precautions for Fire-Fighters: Move container from fire area if it can be done without personal risk. Avoid inhalation of material or combustion by-products. Wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCBA).

NFPA Ratings (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

Health =4

Fire = 0

Reactivity = 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures: Use suitable protective equipment; see Section 8, "Exposure Controls and Personal Protection".

Methods and Materials for Containment and Clean up: Avoid contact with combustible materials. Do not touch spilled material. Move containers away from spill to a safe area. Collect in appropriate container for disposal. For water release, add a reducing agent, add an alkaline material (lime, crushed limestone, sodium bicarbonate, or soda ash), add dilute acid, neutralize.

7. HANDLING AND STORAGE

Safe Handling Precautions: Handling in accordance with all current regulations. See Section 8, "Exposure Controls and Personal Protection".

Storage and Incompatible Materials: Store in accordance with all current regulations and standards, NFPA 430 Code for the Storage of Liquid and Solid Oxidizing Materials. Keep separated from incompatible substances (metals, combustible materials, reducing agents, amines, cyanides, and bases).

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits

OSHA (PEL): 5 $\mu\text{g}/\text{m}^3$ TWA, see 29 CFR 1910.1026 as Cr
2.5 $\mu\text{g}/\text{m}^3$ Action level (as Cr, related to chromium (IV) compounds)
5 $\mu\text{g}/\text{m}^3$ TWA, (related to chromium (IV) compounds)
0.1 mg/m^3 Ceiling

Applies to any operations or sectors for which the hexavalent chromium standard {29 CFR 1910.1026} is stayed or is otherwise not in effect as CrO_3 , related to chromates)

NIOSH (REL): 2 $\mu\text{g}/\text{m}^3$ TWA, (as Cr, related to chromates)
15 mg/m^3 IDLH (as Cr(IV) related to chromates)

Engineering Controls: Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

Personal Protection Measures: In accordance with OSHA 29 CFR 1910.132, subpart I, wear appropriate Personal Protective Equipment (PPE) to minimize exposure to this material.

Respiratory Protection: If workplace conditions warrant a respirator, a respiratory protection program that meets OSHA 29CFR 1910.134 must be followed. Refer to NIOSH 42 CFR 84 for applicable certified respirators.

Eye Protection: Wear splash resistant safety goggles with face shield. Emergency eyewash and quick drench shower should be in immediate work area.

Skin and Body Protection: Chemical resistant clothing and gloves.

9. PHYSICAL AND CHEMICAL PROPERTIES

Properties	Potassium Dichromate
Molar Mass (g/mol)	294.1846
Molecular Formula	Cr ₂ K ₂ O ₇
Appearance (physical state, color, etc.)	red crystalline solid
Odor	odorless
Odor threshold	not available
pH	4.04 (1 % solution)
Evaporation rate	not available
Melting point/freezing point	398 °C (748 °F)
Relative Density as Specific Gravity (water = 1)	2.68 at 25 °C
Density	not available
Vapor Pressure	not applicable
Vapor Density (air = 1)	not applicable
Viscosity	not available
Solubilities	water: 4.9 % at 0 °C
Partition coefficient (n-octanol/water)	not available
Thermal Stability Properties	
Autoignition Temperature	not applicable
Thermal Decomposition	500 °C (932 °F)
Initial boiling point and boiling range	not applicable
Explosive Limits, LEL (Volume %)	not applicable
Explosive Limits, UEL (Volume %)	not applicable
Flash Point	not applicable
Flammability (solid, gas)	not available

10. STABILITY AND REACTIVITY

Reactivity: This material is not reactive at normal temperatures and pressure.

Stability: X Stable Unstable

Possible Hazardous Reactions: Not applicable.

Conditions to Avoid: Avoid contact with combustible materials. Minimize contact with material.

Incompatible Materials: Metals, combustible materials, reducing agents, amines, cyanides, and bases.

Hazardous Decomposition: Miscellaneous decomposition products.

Hazardous Polymerization: Will Occur X Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Exposure: X Inhalation X Skin X Ingestion

Symptoms Related to the Physical, Chemical and Toxicological Characteristics: Potentially fatal on contact with skin, potentially fatal if swallowed, respiratory tract irritation, skin irritation and damage, eye irritation, allergic reactions, kidney damage, cancer hazard.

Potential Health Effects (Acute, Chronic, and Delayed)

Inhalation: Acute exposure can cause irritation and tracheobronchitis. Symptoms may include a cough, sore throat, chest pains, lightheadedness, headache, sinusitis, laryngitis, sneezing, difficulty breathing, pulmonary edema, and fever. Chronic exposure to concentrations from 0.06–0.72 mg/m³ may cause severe irritation, inflammation, ulcerations, and perforation of the nasal septum. Congestion, lung inflammation, emphysema, bronchitis, and bronchopneumonia may also occur. Blood changes, kidney damage, gastrointestinal

disturbances, liver and central nervous system damage have all been attributed to chronic exposure to compounds containing hexavalent chromium. A risk of developing lung and sinonasal cancers has also been reported.

Skin Contact: Acute skin contact may cause irritation and severe burns. Contact with broken skin may cause local necrosis, nausea, vomiting, shock, coma, kidney necrosis, and death. Sensitization reactions may occur in previously exposed persons. Chronic exposure may cause irritative dermatitis, sensitization dermatitis, and sunlight sensitivity. Chronic absorption through damaged skin may cause body ulcerations and kidney damage.

Eye Contact: Eye contact may cause irritation. Chronic exposure may produce conjunctivitis, lacrimation, and dark red bands around the cornea.

Ingestion: Ingestion may cause nausea, vomiting, vertigo, anuria, muscle cramps, convulsions, and coma. Death may result from blood loss into the gastrointestinal tract and other sites. Stomach cancer has been linked to ingestion of compounds containing hexavalent chromium.

Numerical Measures of Toxicity

Acute toxicity: Oral – Category 3; Inhalation – Category 2; Dermal – Category 4

Rat, Oral, LD50: 80 mg/kg; 25 mg/kg to 29 mg/kg Cr(VI)

Rat, Inhalation LD50: 29 mg/m³ to 35 mg/m³ Cr(VI) (4 h)

Rabbit, Dermal, LD50: 403 mg/kg to 490 mg/kg Cr(VI)

Note: Cr(VI) indicates the concentration of Chromium(VI) in potassium dichromate.

Skin corrosion/irritation: Category 1B

Human, skin: 0.5 % mg

Serious eye damage/eye irritation: Category 1

Rabbit, eyes: 140 mg, severe.

Respiratory sensitization: Sensitizer. Category 1B

Skin sensitization: Sensitizer. Category 1B

Germ Cell Mutagenicity: Category 1B

Mutagenic

Human leukocyte, cytogenetic analysis: 2 mg/L

Hamster ovary, mutation in mammalian somatic cells: 6 µmol/L

Human, fibroblast, morphological transform: 100 nmol/L

Carcinogenicity: Category 1A

Listed as a Carcinogen/Potential Carcinogen X **Yes** **No**

IARC lists chromium (VI) compounds (evaluated as a group) as Group 1, *carcinogenic to humans*.

NTP lists chromium (VI) compounds as *known human carcinogen*.

OSHA lists chromium (VI) compounds in OSHA 29 CFR 1910.1026.

Tumorigenic

Human, Inhalation LCLo: 100 µg/m³ (3 years) continuous – olfaction, lung and thorax tumors.

Reproductive Toxicity: Category 1B

Mouse, Subcutaneous, TDLo: 20 mg/kg (8 days pregnant), effects on embryo or fetus, extra embryonic structures and fetotoxicity.

Hamster, Intravenous, TDLo: 7500 µg/kg (8 days pregnant), reproductive effects on fertility, post implantation mortality, specific developmental abnormalities – musculoskeletal system.

Specific target organ toxicity, single exposure: No data available.

Specific target organ toxicity, repeated exposure: Category 1

Repeated contact may cause blood system disorders, heart or cardiovascular disorders, liver disorders, respiratory disorders, skin disorders (chrome holes).

Aspiration hazard: Not applicable.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data

Bluegill (*Lepomis macrochirus*) LC50: 65.6-137.6 µg/L 96 h (static)

Rainbow Trout (*Oncorhynchus mykiss*) LC50: 12.3 mg/L 96 h (semi-static)

Persistence and Degradability: No data available.

Bioaccumulative Potential: No data available.

Mobility in Soil: No data available.

Other Adverse effects: No data available.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose in accordance with all applicable federal, state, and local regulations. Subject to disposal regulations U.S. EPA 40 CFR 262, Hazardous waste number(s) D001, D007. Dispose of in accordance with U.S. EPA 40 CFR 262 for concentrations at or above the regulatory limit (5.0 mg/L).

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: UN3086, toxic solid, oxidizing, n.o.s. (Potassium Dichromate), Hazard Class 6.1, Packing Group I, Subsidiary Risk 5.1

15. REGULATORY INFORMATION

U.S. Regulations

CERCLA Sections 102a/103 (40 CFR 302.4): 4.54 kg (10 lbs) RQ

SARA Title III Sections 302 (40 CFR 355.30): Not regulated.

SARA Title III Section 304 (40 CFR 355.40): Not regulated.

SARA Title III Section 313 (40 CFR 372.65): 0.1 % de minimis concentration [Related to Chromium (VI) Compounds]

OSHA Process Safety (29 CFR 1910.119): Not regulated.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE: Yes

CHRONIC: Yes

FIRE: Yes

REACTIVE: No

PRESSURE: No

State Regulations:

California Proposition 65: This product contains a chemical known to the state of California to cause cancer.

This product contains a chemical known to the state of California to cause reproductive/developmental effects.

U.S. TSCA Inventory: Potassium dichromate is listed.

TSCA 12(b), Export Notification: Section 6, 0.1 % de minimis concentration (See 40 CFR 749.68),

Canadian Regulations: WHMIS Information: Not provided for this material.

16. OTHER INFORMATION

Issue Date: 04 February 2014

Sources: ChemADVISOR, Inc., MSDS *Potassium Dichromate*, 23 December 2013.

CDC, NIOSH, *Chromium (VI) oxide (1:3)*, RTECS# GB6650000, CAS No. 1333-82-0; available at <http://www.cdc.gov/niosh-rtecs/GB657890.html> (accessed Feb 2014).

U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, *Toxicological Profile for Chromium*, Environmental Toxicology Branch, Atlanta GA (2012) <http://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=62&tid=17> (accessed Feb 2014).

Hazardous Substances Data Bank, National Library of Medicine, *Potassium Dichromate* CAS 7778-50-9, Animal Toxicity Studies, available at <http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB> (accessed Feb 2014).

Key of Acronyms:

ACGIH	American Conference of Governmental Industrial Hygienists	NTP	National Toxicology Program
CAS	Chemical Abstracts Service	OSHA	Occupational Safety and Health Administration
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	PEL	Permissible Exposure Limit
CFR	Code of Federal Regulations	RCRA	Resource Conservation and Recovery Act
DOT	Department of Transportation	REL	Recommended Exposure Limit
EINECS	European Inventory of Existing Commercial Chemical Substances	RQ	Reportable Quantity
EPCRA	Emergency Planning and Community Right-to-Know Act	RTECS	Registry of Toxic Effects of Chemical Substances
IARC	International Agency for Research on Cancer	SARA	Superfund Amendments and Reauthorization Act
IATA	International Air Transportation Agency	SCBA	Self-Contained Breathing Apparatus
IDLH	Immediately Dangerous to Life and Health	SRM	Standard Reference Material
LC50	Lethal Concentration	STEL	Short Term Exposure Limit
LD50	Median Lethal Dose or Lethal Dose, 50 %	STOT	Specific Target Organ Toxicity
LEL	Lower Explosive Limit	TLV	Threshold Limit Value
MSDS	Material Safety Data Sheet	TPQ	Threshold Planning Quantity
NFPA	National Fire Protection Association	TSCA	Toxic Substances Control Act
NIOSH	National Institute for Occupational Safety and Health	TWA	Time Weighted Average
NIST	National Institute of Standards and Technology	UEL	Upper Explosive Limit
n.o.s.	Not Otherwise Specified	WHMIS	Workplace Hazardous Materials Information System

Disclaimer: Physical and chemical data contained in this SDS are provided only for use in assessing the hazardous nature of the material. The SDS was prepared carefully, using current references; however, NIST does not certify the data in the SDS. The values for this material are given in the NIST Certificate of Analysis.

Users of this SRM should ensure that the SDS in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 948-3730; e-mail srmmsds@nist.gov; or via the Internet at <http://www.nist.gov/srm>.